

Risk of Product Technology Change in Competitive Markets, The Case of Lubricant Industry in Sri Lanka

By
Hewawasam H.P.V.R.

DECLARATION

The Dissertation was submitted to the department of management of Technology at University of Moratuwa in partial fulfillment of the requirement for the degree of Master of Business Administration



University of Moratuwa, Sri Lanka
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

Department of Management of Technology University of Moratuwa
November 2005

65 "05"
62:65(043)

University of Moratuwa



86353

86353

86353

I certify that this dissertation does not incorporate without acknowledgment any material previously submitted for degree or diploma awarded by institute of learning and to the best of my knowledge and belief it does not contain any material previously published by another person except where due reference is made in the text.



Hewawasam H.P.V.R.

25.01.06
Date:

Approved for submission

Supervisor:



Dr. Gamini Amarasekara

Chief Technology Manager

Caltex Lubricants Lanka Ltd

Colombo

University of Moratuwa, Sri Lanka
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

Date: 25-01-2006

Co-Supervisor:

Dr. Sarath Dassanayake



Senior Lecturer

Department of Management of Technology

University of Moratuwa

Date: 25/01/2006

EXECUTIVE SUMMARY

With liberalization of lubricant industry to act market forces and to stabilize it by allowing more than one player to dominate the market where pricing, customer service, availability and the related technology to come in. It is obvious one could try to penetrate and grab the opportunities with their strengths. Capabilities such as manufacturing facilities in local, technological solutions, global support & experience, ability to deliver bulk quantities and short lead time would enhance the position of the market. There are not many players who do lubricants business in Sri Lanka. Most of them are multinational companies' local subsidiaries and represent their global position here.

As it is sensitive of discussing influential factors in depth, some of the details in influential factors would not be discussed. But most of the past successes and failure which are common to the whole organizations would be discussed.

Lubricant industry also started independent research parallel to other petroleum studies on technological improvements which were needed to improve performances of the lubrication. Since then, lubricant industry has been converting to technology driven industry to gain competitive advantage over one another organizations.

Basically it followed the inductive research methodology and qualitative information analysis method. First factors affects the product technology transfer would be identified by literature survey and by interviewing the professionals in the field. Supplementary factors which Influence of changing product technology will be identified at the expert knowledge areas such as marketing, technology solutions, and operations. The influential factors which govern by economic, social and political are of literature review in public bodies.

Literature survey and case development of expert knowledge reveals the success depend not only criticality of the factor but also occurrence of it. Therefore, selection of entire population is two dimensional where criticality and its occurrence are the two dimensions.

Based on the secondary findings which deducted from entire population of factors, final frame works/model of conclusion of the behavior was rather remote of conventional quantitative models such as ROCE, NPV, IRR and etc. mainly its qualitative nature of the results. In addition its behavior in multidimensional. So that most appropriate frame to analyze the results were priority matrices or weighted score methods. Its multidimensional nature improves the accuracy of the final conclusion to a higher degree.

The findings have been concluded by recommending further studies where the accuracy of final conclusion can be further refined using weighted score method. Based on weighted score method one could elaborate the conclusion which would elevate the accuracy of final conclusion.

ACKNOWLEDGEMENT

I would like to convey my gratitude to Dr. Gamini Amarasekara and Dr. Sarath Dassanayake for their guidance, references and supervision throughout this research work. The support given by them were invaluable and enlightening, despite their busy schedules. Dr. Sarath Dassanayake always kept me in touch and prompted me to do on external submission of this research activity and tried his best me to understand of doing such external publication of this research work. Further, I appreciate the contribution gave me by technical, marketing and production experts at Caltex lubricants Lanka Ltd. and lubricant other companies staff who provided me with valuable information.

Finally I would like to thank my fellow batch mates for making me comfortable through peer support and by sharing their experiences and expertise.

Hewawasam H.P.V.R.



University of Moratuwa, Sri Lanka
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

CONTENTS

Executive Summary	ii
Acknowledgement	iii
List of Figures & Tables	viii
List of Acronyms	ix
1.0 INTRODUCTION	1
1.1 Problem Statement	1
1.2 Objectives of the Study	1
1.3 Importance of Study	1
1.4 Methodology	2
1.4.1 Data Sources Selection	2
1.4.2 Data Collection	2
1.4.3 Data Analysis	2
1.5 Organization of the Study	3
1.6 Limitations of the Study	3
2.0 LITERATURE REVIEW	4
2.1 Literature Survey	4
2.1 History	4
2.2 Nature of the Product	4
2.3 Product Diversification	5
2.4 Evolution of Sri Lankan Lubricants Industry	5
2.5 Market Competition	7
2.6 Market Developments	7
2.6.1 Market Awareness	7
2.6.2 Creation of Needs	8
2.6.3 Segmental Developments	8
2.7 Products Availability	8
2.8 Technology Support	9
2.9 Technology Change	9
2.9.1 Engine design & Fuel quality Trends	10
2.9.1 Product Technology	10

2.9.2 Production Technology	12
2.9.3 Marketing Technology	12
2.9.4 Disposal Technology	13
2.10 Corporate Performance Measurements	14
2.10.1 Business Restructuring and Synergy Realization	14
2.10.2 Earnings	14
2.10.3 Industry Revival	14
2.10.4 Adding Value to the Brand	14
2.10.5 Social Responsibility	15
2.11 Operational Trends	15
2.11.1 Building Business Partnerships	15
2.11.2 Outsourcing non core Businesses	15
2.11.3 Quality Improvements	15
2.11.4 Logistical Synergy	15
2.11.5 Plant Automation	16
2.11.6 Total Solution Provision.	16
2.12 Manufacturing Resources	16
2.12.1 Base oil	16
2.12.2 Additives	17
2.12.2 Packages	17
2.12.2.1 Plastics	17
2.12.2.2 Cartons	17
2.12.2.3: Steel Drums	17
2.13 Lubricants & Their Environmental Impacts	17
2.14 Future developments	18
2.14.1 Base oil Technology	18
2.14.2 Additive Technology	19
2.14.3 Future Lubricant Industry	19
2.15 Emissions & Clean air	20
3.0 CASE STUDY DEVELOPMENT OF EXPERT JUDGEMENT & OTHER FACTORS	21
3.1 Interview with Professionals.	21
3.1.1 Lube Product Application	21
3.1.2 Delivering Recommended Benefits	21
3.1.3 Draining Intervals	22
3.1.4 Competition on Local Blending	22

3.1.5 New Channel Development	22
3.1.6 Service Level Support	23
3.1.7 Environmental Standards & Catalytic Conversion	23
3.1.8 Licensing Agreements for Products	24
3.2 Sri Lankan Environmental Laws & Regulations	24
3.3 Government Policy	24
3.3.1 Taxing Policy on Materials	24
3.3.2 Taxing Policy on Vehicles	25
3.3.3 Liberalization of Fuel Market.	26
 4.0 METHODOLOGY	 27
4.1 Conceptual Analysis	27
4.2 Data Sources Selection	27
4.3 Data Collection	27
4.4 Interviews	28
4.5 Data Analysis	28
4.6 Nature of the Results	28
4.7 Operationalization of Methodology	29
 5.0 PORTER'S FIVE FORCES ANALYSIS ON LUBRICANT INDUSTRY	 31
5.0 Lubricant Industry in Sri Lanka – Porter's Five Forces Analysis	31
5.1 Bargaining Power of the Suppliers	31
5.1.1 Local Supplies	31
5.2 Bargaining Power of Buyers	32
5.3 Threat of new Entrance	33
5.4 Threat from Substitutes	34
5.5 Industry Internal Competition	34
 6.0 CRITICAL SUCCESS FACTORS FOR PRODUCT TECHNOLOGY CHANGE	 36
6.1 Criticality of the Factors Identified	36
6.2 Sample Population & Distribution	37
6.3 Interview Process based on Interview Data	37
 7.0 ANALYZING CSF FOR APPROPRIATE MODEL/FARME	 38
7.1 Appropriate Models fit the CSF in Lube Industry	38
7.2 Discussion of Criticality of the Identified Factors	38

7.2.1 Access to new Technology	38
7.2.2 Market Growth	40
7.2.3 Training	41
7.2.4 Product Diversity	42
7.2.5 Product Technology Failures	43
7.2.6 Government Policy	44
7.2.7 Market Competition	45
7.2.8 Product Availability	47
7.2.9 Total Solution	48
7.2.10 Production Technology	49
7.2.11 Product Use/Disposal regulations	50
 8.0 CONCLUSION & RECOMMENDATIONS	 52
8.1. Introduction	52
8.2 Conclusion	52
8.2.1 Lubricants Industry Analysis	52
8.2.2 Critical Success Factor affecting the Product Technology Changes	54
8.2.3 Prioritizing CSFs	56
8.3 Recommendations	57
8.3.1 Importance of further Studying Industry Dynamics	57
8.3.2 Future Studies for Better Refinement of Conclusion	58
 9.0 REFERENCES	 59
 10.0 APPENDIX	 60

LIST OF FIGURES AND TABLES

Figure 1.1	Evolution of Lubricants Industry	06
Figure 5.1	Porter's Five Forces Summary	35
Table 6.1	Lubricant Companies in Sri Lanka	37
Figure 7.1	Illustration of Access to New Technology	39
Figure 7.2	Illustration of Market Growth	40
Figure 7.3	Illustration of Training	41
Figure 7.4	Illustration of Product Diversity	42
Figure 7.5	Illustration of Product Technology Failures	44
Figure 7.6	Illustration of Government Policy	45
Figure 7.7	Illustration of Market Competition	46
Figure 7.8	Illustration of Product Availability	47
Figure 7.9	Illustration of Total Solution	48
Figure 7.10	Illustration of Production Technology	49
Figure 7.11	Illustration of Product Use/Disposal Regulations	50
Figure 8.1	Summary of Porter's Five Forces Analysis	53
Table 8.2	Representing Critical Success Factors	55
Table 8.3	CSFs in Issue Priority Matrix	56

LIST OF ACRONYMS

CPC	Ceylon Petroleum Corporation
OEM	Original Equipment Manufacturer
CSF	Critical Success Factors
CEA	Central Environmental Authority
NEA	National Environmental Act
API	American Petroleum Institute
IOC	Indian Oil Corporation
BP	British Petroleum
US	United States
LPG	Liquefied Petroleum Gas
IMF	International Monetary Fund
ADB	Asian Development Bank



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk